

REMARKS

Claims 1-11 are pending in this application. By this Amendment, the Abstract is amended to address the objection thereto and claim 11 is added.

Newly added claim 11 is based on original claim 2. No new matter is added by this amendment.

In view of the foregoing amendment and the following remarks, reconsideration of this application is respectfully requested.

Applicants appreciate the courtesy shown to Applicants' representative by Examiner Lerner in the May 20, 2004 interview. Applicants' separate record of the substance of the interview is incorporated into the following remarks.

I. Objection to the Abstract

The Abstract of the disclosure was objected to because it contained the phrase "This invention relates to." The Abstract has been amended in response to the Examiner's objection to eliminate this phrase. Accordingly, reconsideration and withdrawal of the objection are requested.

II. Rejection Under 35 U.S.C. §102(b)

Claims 1-3, 5, 6 and 10 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 6,164,150 to Shindo et al. (hereinafter referred to as "Shindo"). The rejection is respectfully traversed.

Shindo describes a steering angle sensor 26 for detecting the steering angle of the steering wheel 10. The steering angle sensor 26 is mounted on the upper steering shaft 12a. An output angle sensor 30 for detecting the turning angle of the tire 24 is mounted on the lower steering shaft 12b. The steering angle of the steering wheel 10 which is detected by the steering angle sensor 26 and the turning angle of the tire 24 which is detected by the output angle sensor 30 are input to an ECU (Electronic Control Unit) 28. The ECU 28 also receives

a vehicle speed output from a vehicle speed sensor 32 for detecting the vehicle speed. (Col. 3, lines 12-21).

Shindo further describes a variable gear ratio unit 114 including a motor 140 and a reducing unit 142. The motor 140 comprises a stator 146 and a rotor 148 which are mounted in a motor housing 144. A locking mechanism shown in FIG. 12 is arranged on the rotor 148 in the motor housing 144. See generally col. 6, lines 46-57.

The Patent Office alleges that Shindo includes a rotation detecting device, although no citation to any specific teaching in Shindo is provided. However, Shindo describes a steering angle sensor 26 for detecting the steering angle of the steering wheel and the steering angle sensor 26 is mounted on the upper steering shaft 12a.

In the present application, a rotation detecting device (claim 1) or rotation detecting means (claim 10) is provided that functions to detect a rotational position of a rotating shaft 33 of the motor 30. (See, e.g., Figure 1 and paragraph [0023] of the specification). Nowhere does Shindo describe or suggest such a rotation detecting device or rotation detecting means as required by claims 1 and 10, respectively.

In addition, Shindo neither describes nor suggests that the rotational position of a rotating shaft of a motor is detected when the engagement member is inserted in the indented portion. Specifically, claims 1 and 10 require that a lock mechanism rotates together with the rotating shaft of the motor, and in which plural indented portions are formed at an outer periphery portion thereof, and an engagement member which is fitted on a stator side of the motor, the lock mechanism restricting relative rotation of the input shaft and the output shaft by inserting the engagement member in one of the indented portions.

Further, Shindo does not describe or suggest a relationship between a play angle and a first rotational angle θ_2 as required by claims 1 and 10, particularly a relationship in which the play angle is smaller than the first rotational angle.

According to Shindo, the engaging projection 160a is engaged or disengaged from the corresponding engaging recess 168a of the rotary member 168 depending on when the electromagnetic coil is energized. Specifically, when the ECU 28 determines the absence of an excessive reverse input from the tire 24 side, the ECU energizes the electromagnetic coil, thereby disengaging the engaging projection 160a from the engaging recess 168a.

Conversely, when the ECU 28 determines the presence of an excessive reverse input from the tire 24 side, the ECU stops energizing the electromagnetic coil, thereby engaging the engaging projection 160a with the engaging recess 168a. (Col. 7, lines 43-65). Thus, even if Shindo had a rotary sensor, the locking mechanism is directed to responding to either the absence or the presence of an excessive reverse input from the tire 24 side. As such, Shindo fails to describe or suggest a lock mechanism including a lock holder which rotates together with the rotating shaft of the motor, and in which plural indented portions are formed at an outer periphery portion thereof, and an engagement member which is fitted on a stator side of the motor, the lock mechanism restricting relative rotation of the input shaft and the output shaft by inserting the engagement member in one of the indented portions, wherein a play angle between the engagement member and the indented portion when the engagement member is inserted in the indented portion is smaller than a first rotational angle of the motor which is required for outputting all of the predetermined number of different signals as required by claims 1 and 10, and claims dependent therefrom.

Regarding claim 2, Shindo neither describes nor suggests a play angle smaller than a second rotational angle of the motor which is required for outputting all of the signals, the number of which is smaller than the predetermined number by one. As shown in Figure 5 of the present application, the play angle $\theta 1$ is smaller than the second rotational angle $\theta 3$. Shindo neither describes nor suggests any such relationship between angles for outputting all of the predetermined number of different signals.

Newly added claim 11 provides that the play angle is smaller than a second rotational angle of the motor which is required for outputting all of the signals, the number of which is smaller than the predetermined number by one. As described above, Shindo neither describes nor suggests any such relationship between angles for outputting all of the predetermined number of different signals.

For at least the foregoing reasons, Shindo fails to describe or suggest each and every feature of claims 1 and 10 or claims depending therefrom.

Reconsideration and withdrawal of this rejection are respectfully requested.

III. Rejection Under 35 U.S.C. §103(a)

Claims 1-10 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Shindo in view of U.S. Patent No. 6,354,396 to Horton et al. (hereinafter referred to as "Horton"). This rejection is respectfully traversed.

As described above, Shindo fails to describe or suggest the recited elements of claims 1 and 10. The Patent Office has relied on Horton for the use of a steering angle rotation detector with a plurality of magnets and detectors, the detectors being provided in a width of a magnetic pole of one of the magnets in a width direction. However, even if Horton were combined with Shindo as alleged by the Patent Office, the present invention still would not have been achieved because Horton does not remedy the deficiencies of Shindo as described above.

Claim 2 and newly added claim 11 provide that the play angle is smaller than a second rotational angle of the motor which is required for outputting all of the signals, the number of which is smaller than the predetermined number by one. As described above, Shindo neither describes nor suggests any such relationship between angles for outputting all of the predetermined number of different signals.

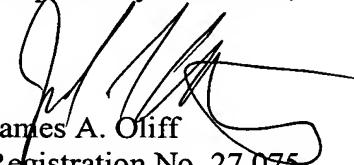
For the foregoing reasons, reconsideration and withdrawal of these rejections are respectfully requested.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-11 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
Abstract

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